There is strong evidence, through family and twin studies, that there could be a substantial genetic influence on the heritability of nicotine and other forms of drug dependence. Because tobacco smoking is the leading avoidable cause of premature death worldwide, it is important to consider that an individual’s addiction to nicotine may be genetically linked. General medical findings with twin studies have found little evidence of a significant genetic contribution to addiction liability. Genome scans have been able to identify an association between nicotine dependence and loci near genes of biological relevance, such as serotonin receptor 5A, or alpha2-nicotinic acetylcholine receptor (CHRNNA2), however researchers have been unable to duplicate these findings. Studies using other candidate genes have been equally disappointing. For example, the Taq1 A1 allele of the ANKK1 gene demonstrated that individuals with this form of the gene are only 1.3-1.5 times as likely to be regular smokers. Many researchers are skeptical at these studies’ lack of repeatability illustrates the complexity of the human genome and that these addiction disorders are likely to be polygenic, and therefore difficult to track genetic linkage.
Completing testing for multiple genetic variants can potentially improve prediction of addiction risk, and large populations would need to be screened in order to find the small number of people who possess these alleles, which will be very costly. Additionally, genome screening seems to be justifiable if an effective treatment has been established for those with alleles that identify them as being at risk. However, this genetic information could be used to begin looking for a treatment for individuals who are presently nicotine dependent. Pharmacologists have attempted to do so in the past, examining polymorphisms in a number of genes in studies involving smoking cessation. However, these studies were inconclusive and findings have not been able to be duplicated. Being able to predict an individual’s genetic liability to nicotine addiction could have profound impacts on society. Vaccines being developed against nicotine could potentially be used on adolescents to prevent them from smoking; however it is unlikely that any preventative vaccination would be an effective or ethical treatment.

Identifying commonly occurring alleles that are a strong predictor for nicotine addiction has been a challenge that has been met largely by failure. Any susceptibility alleles that have been identified are seen to increase risk weakly at best, and screening for these alleles would be a time and money consuming process. Any genetic linkages to nicotine addiction would have to be much more conclusive to be used for possible intervention.

I think that any possible way to facilitate people addicted to nicotine or other drugs would be worth the investment, however after reading this article, I found out exactly how difficult that would be. This study talked extensively about ethical implications to developing an interventional style of treatment for addiction, and I can see
how this could possibly be a significant ethical debate. Just like what had previously
happened with the Gardasil vaccine, public schools could potentially begin requiring
students to receive an anti-addiction vaccine if one ever became available, which could
cause a lot of controversy. However, I think that with studies such as this, the good that
could be created would outweigh the bad and they are essential into helping us better
understand addiction.